

WHAT IS CLAIMED IS:

1. A fluid-dispensing device attachable to an air-intake system of an internal combustion engine for introducing an engine cleaner composition into the air intake system, the fluid-dispensing device comprising:

- 5 (i) a pressure-resistant container having a reservoir and a discharge orifice, the reservoir charged with an engine cleaner composition and a propellant;
- 10 (ii) an on-off valve having an inlet and an outlet, the inlet connected in with the discharge orifice of the pressure-resistant container for receiving engine cleaner composition discharged from the container; and
- 15 (iii) a length of flexible tubing having an inlet end and an outlet end and a central bore extending from the inlet end to the outlet end, the inlet end of the tubing connected with the outlet of the valve for receiving engine cleaner composition discharged from the pressure-resistant container through the valve;

20 wherein the fluid-dispensing device provides a flow rate of engine cleaner composition at the outlet end of the length of flexible tubing ranging from about 25 to about 50 grams per minute.

25 2. The fluid-dispensing device of claim 1 wherein the pressure-resistant container has a pressure ranging from about 20 lbs/in² to about 30 lbs/in².

30 3. The fluid-dispensing device of claim 1 wherein the tubing has a length ranging from about 3 to about 20 feet.

4. The fluid-dispensing device of claim 1 wherein the tubing has a circular central bore having a diameter ranging from about 0.050 to about 0.080 inches.

5. The fluid-dispensing device of claim 1 wherein the engine cleaner composition comprises:

a single phase solution comprising:

- 5 (i) a polar solvent having a Hildebrand solubility parameter of about 10 cal $^{1/2}$ cm $^{-3/2}$ or greater;
- (ii) a non-polar solvent, immiscible with the polar solvent, having a Hildebrand solubility parameter of about 10 cal $^{1/2}$ cm $^{-3/2}$ or less; and
- 10 (iii) a fugitive cosolvent having a higher evaporation rate than the polar solvent and the non-polar solvent.

6. A fluid-dispensing device attachable to an air-intake system of an internal combustion engine for introducing an engine cleaner composition into an air intake system through a vacuum port, the fluid-dispensing device comprising:

- 15 (a) a container having a reservoir and a discharge orifice, the container charged with an engine cleaner composition;
- (b) a length of flexible tubing having an inlet end and an outlet end and a central bore extending from the inlet end to the outlet end, the inlet end of the length of flexible tubing in communication with the reservoir of the container for receiving engine cleaner composition from the reservoir; and
- (c) a vacuum port adapter having an inlet end and an outlet end, the inlet end in communication with the outlet end of the flexible tubing and the outlet end adapted to be friction fit within the vacuum port; 20 wherein the fluid-dispensing device when connected to the air intake plenum of an internal combustion engine providing a vacuum ranging from about 18 to about 22 inches of Hg provides a flow rate of engine cleaner composition ranging from about 25 to about 50 grams per minute.

25 30 7. The fluid-dispensing device of claim 6 wherein the flexible tubing has a length ranging from about 3 to about 20 feet.

8. The fluid-dispensing device of claim 6 wherein the flexible tubing has a circular central bore having a diameter ranging from about 0.050 to about 0.080 inches.

9. The fluid-dispensing device of claim 6 wherein the engine cleaner composition comprises:
5 a single phase solution comprising:
10 (i) a polar solvent having a Hildebrand solubility parameter of about 10 cal $^{1/2}$ cm $^{-3/2}$ or greater;
(ii) a non-polar solvent, immiscible with the polar solvent, having a Hildebrand solubility parameter of about 10 cal $^{1/2}$ cm $^{-3/2}$ or less; and
(iii) a fugitive cosolvent having a higher evaporation rate than the polar solvent and the non-polar solvent.

15 10. A method of cleaning an internal combustion engine having a vacuum port in communication with an air intake manifold, the method comprising the steps of:
(d) providing a fluid-dispensing device according to claim 6;
(e) connecting the fluid-dispensing device to the vacuum port; and
(f) operating the internal combustion engine to generate a vacuum at the
20 vacuum port thereby causing the engine cleaning composition to be drawn from the reservoir through the tubing and into the air intake manifold of the internal combustion engine.

11. A method of cleaning an internal combustion engine having an air intake manifold, the method comprising the steps of:
25 (e) providing a fluid-dispensing device according to claim 1;
(f) inserting the outlet end of the flexible tubing into the air intake manifold of the internal combustion engine;
(g) operating the internal combustion engine; and
(h) opening the on-off valve to allow engine cleaner composition to flow under
30 pressure of the aerosol propellant from the reservoir through the tubing and into the air intake manifold of the internal combustion engine.